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new varieties in the manner I have recommended. When young trees have sprung from the seed, a certain period must elapse before they become capable of bearing fruit, and this period, I believe, cannot be shortened by any means. Pruning and transplanting are both injurious; and no change in the character or merits of the future fruit can be effected, during this period, either by manure or culture. The young plants should be suffered to extend their branches in every direction, in which they do not injuriously interfere with each other; and the soil should just be sufficiently rich to promote a moderate degree of growth, without stimulating the plant to preternatural exertion, which always induces disease.† The periods which different kinds of fruit trees require to attain the age of puberty, admits of much variation. The Pear requires from twelve to eighteen years; the Apple, from five to twelve, or thirteen; the Plum and Cherry, four or five years, and the Vine, three or four; and the Raspberry, two years. The Strawberry, if its seeds be sown early, affords an abundant crop in the succeeding year. My garden at present contains several new and excellent varieties of this fruit, some of which I should be happy to send to the Horticultural Society, but the distance renders it impracticable.‡

On raising new and early varieties of the Potato (Solanum Tuberosum). By Thomas Andrew Knight, Esq. F.R.S. &c.

(From the Transactions of the Horticultural Society of London.)

The Potato contributes to afford food to so large a portion of the inhabitants of this country, that every improvement in its culture becomes an object of national importance; and whence I am induced

† The soil of an old garden is peculiarly destructive.

‡ The Hautboy Strawberry does not appear to propagate readily with the other varieties, and may possibly belong to an originally distinct species. I have, however, obtained several offspring from its farina; but they have all produced a feeble and abortive blossom. If Nature, in any instance, permits the existence of vegetable mules, (but this I am not inclined to believe,) these plants seem to be beings of that kind.

to hope that the following communication may not be unacceptable to the Horticultural Society.

Every person who has cultivated early varieties of this plant must have observed, that they never afford seeds, nor even blossoms, and that the only method of propagating them is by dividing their tuberous roots: and experience has sufficiently proved, that every variety, when it has been long propagated, loses gradually some of those good qualities which it possessed in the earlier stages of its existence. Dr. Hunter, in his *Georgical Ed.* says, I think has limited the duration of a variety, in a state of perfection, to about fourteen years: and, probably, taking varieties in the aggregate, and as the plant is generally cultivated, he is nearly accurate. A good new variety of an early potato is therefore considered a valuable acquisition by the person who has the good fortune to have raised it; and as an early variety, according to any mode of culture at present practised, can only be obtained by accident from seeds of late kinds, one is not very frequently produced: but by the method I have to communicate, seeds are readily obtained from the earliest and best varieties; and the seeds of these, in successive generations, may not improbably ultimately afford much earlier and better varieties than have yet existed.

I suspected the cause of the constant failure of the early potato to produce seeds to be the preternaturally early formation of the tuberous root; which draws off for its support that portion of the sap which, in other plants of the same species, affords nutriment to the blossoms and seeds: and experiment soon satisfied me that my conjectures were perfectly well founded.

I took several methods of placing the plants to grow in such a situation as enabled me readily to prevent the formation of tuberous roots; but the following appearing the best, it is unnecessary to trouble the Society with an account of any other.

Having fixed strong stakes in the ground, I raised the mould in a heap round the bases of them; and in contact with the stakes: on their South sides I planted the potatoes from which I wished to obtain seeds. When the young plants were about four inches high they were secured to the stakes with shreds and nails,

and the mould was then washed away, by a strong current of water, from the bases of their stems, so that the fibrous roots only of the plants entered into the soil. The fibrous roots of this plant are perfectly distinct organs from the runners, which give existence, and subsequently convey nutriment to the tuberous roots; and as the runners spring from the stems only of the plants, which are, in the mode of culture I have described, placed wholly out of the soil, the formation of tuberous roots is easily prevented; and whenever this is done, numerous blossoms will soon appear, and almost every blossom will afford fruit and seeds. It appears not improbable, that by introducing the farina of the small, and very early varieties into the blossoms of those of larger size, and somewhat later habits, moderately early varieties, adapted to field culture, and winter use, might be obtained; and the value of these to the farmer, in the colder parts of the kingdom, whose crops of potatoes is succeeded by one of wheat, would be very great. I have not yet made any experiment of this kind, but I am prepared to do it in the present spring.

Method of making an artificial Fire proper for Signals; by M. de Zach.

(From his Astronomical and Geographical Correspondence.)

The composition of the powder of which this fire is made, has hitherto been kept secret by the English, because they make it an object of commerce, and sell it to the French astronomers, who use it for signals, &c. M. de Zach gives the following account of this powder, and of the method of preparing it.

It is sold in wooden boxes; the fire produced from one of the boxes, of six inches diameter and four inches high, which was lighted by General Roy on the English coast, was seen very distinctly by M. Mechain with the naked eye on the French coast, at a distance of forty miles over the sea, in overcast and cloudy weather.

The fire from another of these boxes, lighted by M. Legendre at Dunkirk, was seen with the naked eye by M. Cassini at Cape *Blanc-nez*, as distinctly as the planet Venus when brightest, although the distance was 20,000 toises.

The powder is prepared in the following manner:

Twenty-four parts of saltpetre, seven parts of flowers of sulphur, and two parts red arsenic, are pulverized and well mixed together. This mixture is enclosed in round or square boxes of thin wood; in general the height of the round boxes is half their diameter; and the square are made double the size of the round. They are closed with a cover of the same wood, in the middle of which a small hole is made by which the powder is lighted.

When these boxes are made for carriage, paper is pasted all round them, and also over the hole in the lid, that the powder may not be scattered. When the box is lighted, the paper that joins the covering of the lip is first taken off, and then that which is over the hole; it is lighted with a common match, and takes fire in an instant without explosion. It spreads a very brilliant light, with a little smoke, which the person who lights it must be careful to avoid; a box of six inches diameter and three inches high, burns nearly for the space of three minutes, and the light may be perceived a little before sun-set at the distance of 36,000 toises. The light of this fire is so dazzlingly bright, that it affects the eyes of those who approach very near to it, in the same manner as the sun, rendering them incapable of distinguishing objects for some time afterwards.

The price of this powder is nearly the same as common gunpowder.

The matches are prepared as follows:—four parts of refined saltpetre are pulverized, and well mixed with two parts of gunpowder, two parts of charcoal, and one part of flowers of sulphur, the whole is then passed through a sieve. This powder is put into paper cartridges the length of the quill of a pen, the cartridges are made of strong paper rolled round a stick two feet long, and the powder is pressed in with a piece of round wood of the same dimensions.

These matches are fastened to a stick of a suitable length, the edge of the paper is cut with scissars, and the match is lighted by a candle. The effect never fails, and the matches are proof against wind and rain. In order to extinguish them, the lighted end must be cut off.

An artificer of Marseilles proposes to make these matches of a mixture of eight parts of flowers of sulphur, four of saltpetre, and two of gunpowder, the whole